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ABSTRACT

This report describes the decision-making model that provides the theoretical framework being developed by the Early Childhood Research Institute on Measuring Growth and Development (ECRI-MGD) in a 5-year project to generate a set of common child and family indicators that can be used within a comprehensive system of service delivery for young children with disabilities, birth to age 8. The report first looks at the current model of assessment and service delivery in early intervention and limitations of the model. These limitations include lack of linkage across assessment phases, lack of linkage to long-term goals, and lack of theoretical framework for decision making. It then explains the rationale for and components of the Problem-Solving Model of decision making. It identifies theoretical assumptions and the two types of assessment tools used, Individual Growth and Development Indicators and Exploring Solutions Assessments. A table provides an overview of the ECRI-MGD Problem-Solving Model including the decision-making phase, questions, and assessment tools and procedures utilized. The final section discusses similarities and differences between the ECRI-MGD Problem Solving Model and the current model of assessment in early intervention. (Contains 21 references.) (DB)

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ON

MEASURING GROWTH & DEVELOPMENT

TECHNICAL REPORT #6

THEORETICAL FOUNDATIONS OF THE EARLY CHILDHOOD RESEARCH INSTITUTE ON MEASURING GROWTH AND DEVELOPMENT: AN EARLY CHILDHOOD PROBLEM-SOLVING MODEL

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APRIL 1998

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Abstract

The American public is increasingly demanding a higher level of documentation and accountability from educators and other human service providers regarding the quality and effectiveness of the services they provide. The Goals 2000:Educate America Act (P.L. 103-227), for example, reflects the desire for educational goals at the national level and supports the development and evaluation of assessments and procedures used to measure progress toward educational goals. A model of early childhood assessment and service delivery is needed that can address the need for greater accountability and that can provide answers to questions such as, "what makes early intervention and related services more effective, and how can we ensure that *all* children have access to effective early intervention services?"

The *Early Childhood Research Institute on Measuring Growth and Development* (ECRI-MGD) proposes to address this need by generating a set of common child and family indicators that could be used within a comprehensive system of service delivery. Specific Goals of ECRI MGD are:

1. To identify common Developmental Outcomes for infants, toddlers, preschool- and early elementary-aged children and their families;
2. To develop and fully evaluate Individual Growth and Development Indicators (IGDIs) for each Outcome, so that parents and practitioners can gather information that describes growth and development over time for individual children or for groups of children in classrooms, programs, districts, or states;
3. To select or develop Exploring Solutions Assessments (ESAs) that describe program features, child variables, and ecobehavioral interactions associated with growth and development, such that parents and practitioners have information to monitor and rationally plan changes in the quality of intervention and other services;
4. To develop and field-test a comprehensive Growth and Development Measurement System, gathering information on frequency and fidelity, cost, and benefits of use in a wide range of settings and service options; and
5. To disseminate information to a broad array of audiences (including parents, practitioners, administrators, policy makers, and other researchers) about Developmental Outcomes and the development and use of a comprehensive approach to measuring Growth and Development.

The purpose of this report is to describe the decision-making model that provides the overarching theoretical framework for the comprehensive growth and development approach being developed by ECRI-MGD. The Problem-Solving Model described in this report is a work in progress. The application of the Problem-Solving Model to a Growth and Development Approach to assessment and service delivery in early intervention was developed in response to problems with current assessment approaches and practices in the field of early intervention. The ECRI-MGD Problem-Solving Model incorporates current promising approaches to early childhood assessment and supports the "new vision" for developmental assessment as outlined by the Zero to Three/National Center for Infants, Toddlers, and Families Work Group on Developmental Assessment (see Meisels & Fenichel, 1996).

In this Technical Report, the current model of assessment and service delivery in early intervention and limitations of the model will be discussed, followed by the rationale for and description of the ECRI-MGD Problem-Solving Model of decision making.

Current Model of Assessment for Early Intervention

Assessment is the process of gathering information for the purpose of making decisions. Developmental assessment in early childhood is designed to gain information about a child's skills and capabilities as well as of the environments that provide the contexts for learning in order to make decisions that will support the development of the child.

The current model of assessment in early childhood intervention consists of a sequence of several distinct steps that serve different assessment purposes: (a) screening, (b) diagnosis and determining eligibility, (c) programming, and (d) evaluation (e.g., Bagnato, Neisworth, & Munson, 1997; Meisels, 1994, 1996). Each step in the model serves a different purpose and utilizes different instruments and procedures, as shown in Table 1.

The first assessment step, screening, is a procedure used to identify those children who have a suspected developmental delay and who, therefore, require further assessment. Typically, the tools used are standardized, norm-referenced instruments that have been designed to discriminate children who may have developmental delays and need further assessment from typically developing peers who do not need intervention. This is done by comparing the performance of an individual child on the test to the performance of a normative group on the same measure. Screening tests are quick and easy to administer so that they can be used to screen large numbers of children efficiently and cost effectively.

When a child is identified as needing further assessment, the child moves to the second step of the assessment process, that of diagnosis and determining eligibility for early intervention. To confirm the existence of a problem, tests or procedures are used that compare a child's performance on the test with children in the normative group on the same test in an effort to discriminate children who have developmental delays from those who are typically developing. In addition, to clarify the nature of the problem, tests and procedures are used that assess in detail a child's skills in the areas of suspected delay. As with screening decisions, diagnostic evaluations typically rely on the use of standardized, norm-referenced tests of developmental status.

Table 1. Assessment Functions

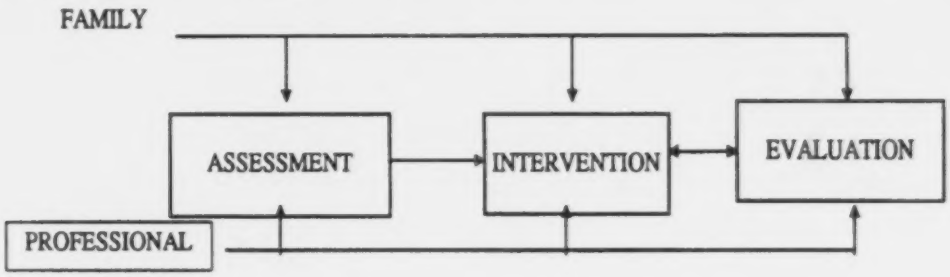
Assessment Purpose	Purpose	Type of Measure	Examples
Screening	Identify children who have a suspected delay and who require further assessment	Standardized, norm-referenced tests designed for screening	Denver Developmental Screening Test; Developmental Indicators for the Assessment of Learning–Revised
Eligibility Determination	Confirm existence of delay or disorder and determine nature of delay/disorder	Standardized, norm-referenced tests	Bayley Scales of Infant Development–Second Edition; Wechsler Preschool and Primary Scale of Intelligence–Revised; Battelle Developmental Inventory
Programmatic Assessment	Provide information to develop IEP/IFSP Determine content and strategies for intervention	Multi-domain curriculum-based assessment instruments	Assessment, Evaluation and Programming System; Hawaii Early Learning Profile
Evaluation	Determine whether interventions have produced desired outcomes	Standardized, norm-referenced tests and Multi-domain curriculum-based assessment instruments	Battelle Developmental Inventory; Assessment, Evaluation and Programming System

Following determination of eligibility, the next step of the assessment process is programmatic assessment for intervention development. The primary purpose of programmatic assessment is to gain an accurate picture of a child's current strengths and needs in multiple domains across settings in order to develop individual educational plans (IEPs) and Individual Family Service Plans (IFSPs). An important consideration in programmatic assessment is linkage to the curriculum (Bagnato, Neisworth, & Munson, 1997; Bricker, 1989). Thus, the types of instruments and procedures used for programmatic assessment include curriculum-based assessment tools such as the Assessment, Evaluation, and Programming System (AEPS) (Bricker, 1993) and the Hawaii Early Learning Profile (Furuno et al., 1985). With curriculum-based assessment, assessment items are coordinated with the curriculum content, providing information that is directly relevant to the development of interventions (Notari, Slentz, & Bricker, 1991).

The last step in the process, evaluation, is used to determine whether the interventions chosen have produced the desired outcomes and moved the child closer to IEP/IFSP goals. Program evaluation can be conducted at both the individual and group levels and may involve daily, weekly, monthly, or quarterly assessment. Direct observations and charting of targeted behaviors often are used for daily and weekly progress monitoring. Monthly and quarterly evaluation of intervention effects can be carried out by subsequent administrations of the same curriculum-based assessment instrument that was used for initial program planning. In this way, programmatic assessment is linked to intervention efforts as well as to the evaluation of intervention (Bricker, 1989, 1996).

The past 10 years have seen a dramatic change in the conceptualization of early childhood assessment. Greater understanding regarding the complexity of development and the role of the environment has led to the development of a variety of naturalistic and functional assessment procedures as well as a greater emphasis upon assessment for the purpose of intervention planning. Increasingly, researchers and leaders in the field of early intervention advocate a systems approach to assessment in early intervention (Bagnato & Neisworth, 1991; Bagnato, Neisworth, & Munson, 1997; Bailey & Wolery, 1992; Bricker, 1989, 1996; Meisels, 1996). In this context, a system refers to the active linking of assessment, intervention, and evaluation activities. According to Bricker (1989, 1996), there should be a direct relationship between the initial assessment information, child and family outcomes, intervention strategies, and procedures used to evaluate progress toward the child and family outcomes. Specifically, in such a system, the information acquired during assessment is used to develop outcomes or goals for a child and family. The outcomes guide the selection of intervention content and strategies. Evaluation, in turn, focuses on the attainment of outcomes and should be congruent with the assessment procedures. Figure 1 contains a schematic illustrating a linked systems approach that directly links assessment, intervention, and evaluation.

Figure 1. Linked System Approach to Assessment



In a linked systems approach each of the components is tied to the other. Assessment leads to the development and implementation of interventions; intervention implementation leads to evaluating and revising the program. The assessment activities should provide information that is useful in identifying what and how to teach. In particular, the initial assessment activities should provide the necessary information to establish a baseline measurement of the child's skills as well as select appropriate and relevant outcomes for developing intervention. As depicted in the schematic, within this system, families should have input at all phases of the linked system.

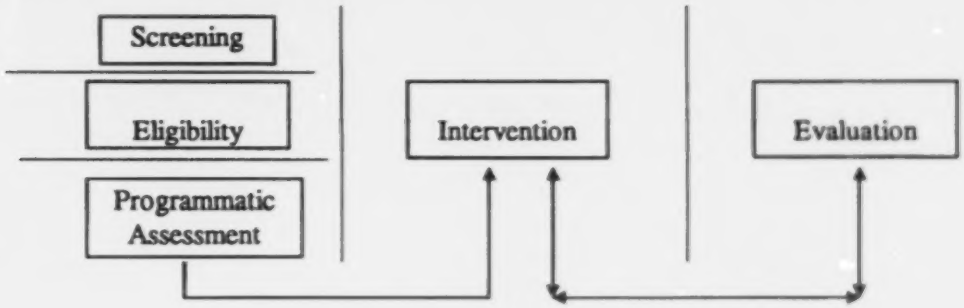
Limitations of Current Assessment Model

Despite advances in early childhood assessment procedures and greater emphasis on assessment for intervention development, there remain a number of problems with the current model of assessment. Problems include: (a) a lack of linkage between assessment procedures and tools across assessment phases, (b) lack of clear linkage between assessment and important long-term outcomes for children, and (c) lack of an overarching theoretical framework for decision-making within the model.

LACK OF LINKAGE ACROSS ASSESSMENT PHASES

In the current model of assessment, information from the various assessment procedures and instruments used in the different steps are not linked to one another, making a comprehensive and integrated system of assessment and service delivery difficult to implement. Even when a linked system is in place, the linked system begins with the administration of curriculum-based and criterion – referenced tools for the purpose of developing intervention plans *after* identification and determination of eligibility for services and placement in a program. When the standardized norm-referenced tests (SNRTs) that are used for determining eligibility for early intervention are used for determining outcomes, there is no linkage or continuity between the determination of initial outcomes, and the subsequent programmatic assessment that is used to determine intervention content and strategies as depicted in Figure 2.

Figure 2. Lack of Linkage Across Steps



Current trends in early childhood assessment are toward the use of criterion-referenced assessment for the purposes of intervention planning; however, there remains a need for development of procedures that can be used for identification purposes and that *also provide meaningful information linked to intervention planning.* Rather than dismissing the use of all norm-referenced procedures, it is important that reliable and valid procedures be used for identification purposes and that such *identification and corresponding procedures are included as a part of the linked system.*

LACK OF LINKAGE TO LONG-TERM GOALS

As described above, there is a trend toward greater use of criterion-referenced instruments as alternatives to norm-referenced tests for assessment in early childhood. While a norm-referenced test provides a comparison relative to other children, a criterion-referenced test indicates a level of mastery relative to an absolute set of standards for a set of skills or behavioral objectives within a curriculum. A criterion-referenced test is constructed by task analyzing a developmental domain or area of curriculum. Measurement procedures are designed for each of the tasks and subtasks and progress is measured through the hierarchy of subtasks. Such an approach to measurement is commonly referred to as mastery monitoring (Fuchs & Deno, 1991).

While one of the advantages of a mastery monitoring approach is the direct linkage to the curriculum and instruction, linkage to important long-term outcomes is not necessarily clear. According to Deno (1997), the validity of a mastery monitoring approach depends on the validity of the task hierarchy on which the monitoring system is based. In other words, measured progress through a specified hierarchy of tasks or skills may not correspond to growth and development toward long-term outcomes in the domain in which progress is being measured.

While mastery monitoring has a place in early childhood assessment because of the direct linkage to curricula and intervention, *procedures that can be used to directly and repeatedly measure growth and development toward long-term outcomes also are needed* for a comprehensive and integrated assessment system. Fuchs and Deno (1991) refer to this type of long-term assessment as General Outcome Measurement. In General Outcome Measurement, performance *on the desired long-term outcome* is sampled repeatedly to assess growth and development toward that outcome.

LACK OF THEORETICAL FRAMEWORK FOR DECISION MAKING

Researchers in the field of early childhood intervention have proposed approaches that address some of the limitations of the current model of assessment in early childhood intervention. Bagnato, Neisworth, and Munson (1997), for example, advocate for a convergent assessment model in which assessment information is gathered from multiple measures, domains, sources, settings, and occasions. Barnett et al. (1992) promote an ecobehavioral approach in which assessment is guided by intervention design and Campbell (1991) calls for a top-down approach to assessment in early childhood in which assessment is guided by desired outcomes. Meisels (1996) describes a continuous model of performance assessment in which monitoring of progress is ongoing. All four of these models stress the need for team collaboration and the use of a multidimensional approach using assessment tools and strategies specifically selected for an individual child and family. None of the suggested approaches, however, provides an overarching theoretical framework for decision making across all phases of assessment, including identification and diagnosis/eligibility. Rather, the assessment approaches or models described in the literature are procedural models encompassing a series of steps and/or procedures for conducting assessments. A wide range of assessment procedures and tools are available and selection of appropriate procedures is guided by a series of generic recommended practices for assessment (e.g., Bagnato, Neisworth, & Munson, 1997; Meisels, 1996). Decision-making follows assessment, and again, decision-making practices are guided by general recommendations for "collaborative decision making."

It is our belief that the fragmentation existing in current practice can be overcome by coordinating assessment and service delivery within an overarching model that *includes all phases of the assessment/service delivery system.* We propose a Problem-Solving model as the logical paradigm within which to coordinate all phases and all procedures of assessment. The Problem-Solving Model to be used for ECRI-MGD is an expansion of a data-based problem solving laid out by Deno (1989) and incorporates characteristics of convergent, top-down, ecobehavioral, and continuous performance monitoring approaches to assessment.

Problem-Solving Model of Decision-Making

Deno's (1989) Problem-Solving Model, consists of a series of decision-making phases and questions that guide assessment. In the model utilized by ECRI-MGD, *outcomes* are emphasized rather than problems and assessment is guided by exploring strategies to achieve desired outcomes. The basic steps in the ECRI-MGD Problem-Solving model include: (a) establishing desired outcomes, (b) identifying concerns relative to desired outcomes, (c) validating concerns by describing current level of performance in areas of concern relative to desired outcomes, (d) exploring strategies for achieving desired outcomes, (e) implementing strategies and evaluating the effectiveness of strategies, and (f) determining whether the interventions have been sufficient and whether the child is no longer at risk.

The ECRI-MGD Problem-Solving Model is similar to the current model of assessment for early intervention in that it relies on a set of decision-making steps and utilizes different assessment procedures for different steps. There are some basic differences, however, with regard to the theoretical assumptions underlying the model, as well as with the types of assessment tools and procedures used.

Theoretical Assumptions

Like the current model, the Problem-Solving Model is sequential, with one phase following another rationally. The sequential nature of the Problem-Solving Model provides the procedural advantages of the current model; however, as opposed to the current model, the Problem-Solving Model is "theory-driven" by a series of underlying assumptions. The assumptions underlying the Problem-Solving Model are outlined by Shinn and Bamonto (1998).

First and foremost, within the Problem-Solving model, a problem is defined as a discrepancy between what is expected and what is occurring in a specific context. This definition of a problem differs from the traditional one, in which a problem is viewed as a disability residing within the individual. Within a problem-solving model, the question is not, "Does this child have a problem?" but rather, "Is there a discrepancy between this child's skills/behavior/development and our expectations for this child within this context?" For example, a language delay would be defined as a discrepancy between the communication skills and behaviors that a child uses with caregivers at home or with peers at school compared to the expectations from the local school or community, rather than a national, decontextualized standard. The implication for assessment within this model is the need to assess environments and interactions between children and caregivers within environments in addition to assessing children.

Second, within a Problem-Solving model, the need for special programs (e.g., early intervention) is driven by societal values and is based on *need* rather than diagnostic label. For example, it is the

child's need for functional communication skills that would warrant early intervention rather than the child's diagnosis of autism. The implication for assessment from this assumption is the need to assess children's functional skills, or those that are "useful in everyday situations with a variety of objects and/or people" and that "increase the child's ability to interact within the daily environment" (Notari, 1988, p. 160).

Finally, an inherent assumption of the Problem-Solving Model is the notion that the effects of interventions cannot be known in advance and that effective interventionists must "generate many possible plans of action prior to attempting problem solution" (Deno, 1989, p. 11). Deno (1986), in discussing individual differences in response to interventions, demonstrates the differential effects of the same intervention for two different children. Given the same intervention introduced into the children's programs at the same time, one child's performance increased dramatically while the second child's performance improved very little. Thus, program changes affecting one student positively may have little or even a negative effect on another. Currently, we do not have the knowledge or technology to know in advance what intervention will work with which child. According to Shinn (1995), we must treat all of our interventions as testable hypotheses that must be evaluated formatively for each individual student. Frequent measurement allows a teacher to determine whether or not a particular intervention is effective for an individual child and whether or not a modification in instruction is warranted.

Assessment Tools and Procedures

Within the Problem-Solving Model, two types of assessment tools and procedures are utilized: Individual Growth and Development Indicators (IGDIs) and Exploring Solutions Assessments (ESAs). IGDIs are a set of common measures that provide for assessment of child or family development on a repeated basis over time such that parents and practitioners can gather information that describes changes over time for individual children or for groups of children in classrooms, programs, districts, or states. IGDIs are intended to describe children's growth and development over time, and thus to indicate when this progression is on-track toward some desired outcome, or when intervention or a modification in intervention is needed. Exploring Solutions Assessments (ESAs) are a varied set of tools providing information to guide the development of interventions. ESAs describe program features, child behaviors and skills, curricular variables, and ecobehavioral interactions associated with growth and development. The rationale for and a complete description of IGDIs and ESAs are provided in ECRI-MGD Technical Reports 4 and 5.

Both IGDIS and ESAs are related to the general Outcomes and are used in an integrated fashion across all of the Problem-Solving phases. Such an integrated use of tools and procedures across Problem-Solving phases differs from the current model of assessment, in which a large number of tools and procedures are selected and used for different assessment purposes. In the current assessment model, the selection of tools and procedures is based on general guidelines for assessment, rather than on a theoretical framework.

Problem-Solving Phases

Table 2 provides an overview of the ECRI-MGD Problem-Solving Model including the decision-making phase, questions, and assessment tools and procedures utilized.

ESTABLISH OUTCOMES

The first step of the ECRI-MGD Problem-Solving Model is to establish Developmental Outcomes. The development of appropriate and meaningful outcomes for young children is the corner stone upon which an effective system of assessment and service delivery in early intervention rests. Outcomes are long-term goals or statements of what the child is expected to learn/achieve. It is these Outcomes that guide the assessment process as well as the development of interventions.

In ECRI-MGD Technical Report #2 we have described the importance and development of Developmental Outcomes for this comprehensive Growth and Development Measurement system.

IDENTIFICATION

For young children, the purpose of Identification within a Problem-Solving Model is to determine which children differ substantially from their peers in terms of their growth and development and thus are potentially at risk for developmental and learning difficulties. Identification in this context corresponds to the screening step in early intervention, a process whereby brief assessment procedures are administered to large numbers of children to identify those who should undergo further, more intensive assessment (Meisels, 1985). For this decision, Individual Growth and Development Indicators will be used. IGDIs are utilized for Identification because a data-based decision is required to determine whether a child's growth and development is significantly different from that of same-age peers.

Table 2. Overview of ECRI-MGD Problem-Solving Model

Decision-Sources Phase	Question	Data-Based Comparison	Potential Making of Data
1. Identify	• Which children are potentially at risk of developmental difficulties and/or early school difficulties because of low developmental skills?	• Compare individual child's performance to normative context or expected performance to evaluate discrepancy	• IGDIs
2. Validate	• Are the child's low skills in a developmental domain of sufficient severity and persistence that intervention is warranted?	• Compare individual child's performance to normative context or expected performance to evaluate discrepancy • Compare child's performance to past performance to evaluate trend	• IGDIs
3. Explore Solutions	• What kind of intervention program should we provide? • What environmental modifications should we make to facilitate development? • What are the goals/objectives of instruction? • What skills should we teach and how should we teach them?	• Performance relative to the continuum of skill development, Performance on related skills; error analysis of performance • Assessment of Programmatic Features • Eco-behavioral Assessment • Child-Focused Assessment	• ESAs
4. Evaluate Solutions	• Is the intervention effective in improving the child's developmental skills?	• Monitor child's progress during intervention (compare to past performance) to evaluate trend and projected performance	• IGDIs
5. Resolve	• Is the child no longer at risk of developmental or learning difficulties because of low developmental skills?	• Compare individual child's performance to normative context or expected performance to evaluate discrepancy	• IGDIs

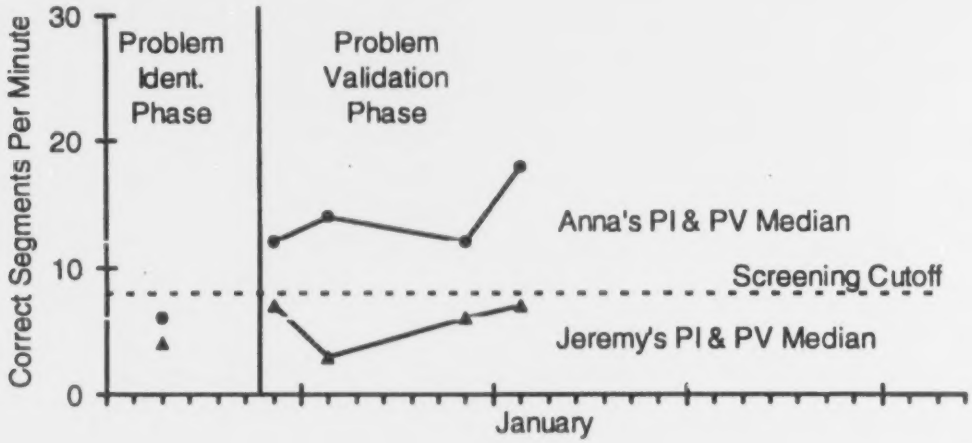
As recommended by Meisels and Provence (1989), the process of early identification should occur on a *recurring* and *periodic* basis. As with screening in early intervention, a one-time measurement using IGDIs provides only a snapshot of the child's growth and development. Therefore, IGDIs should be utilized for Problem Identification by systematically screening all children at regularly occurring intervals (e.g., quarterly). By measuring growth and development on an ongoing basis those children who are at risk may be identified early and interventions can focus on *prevention* rather than remediation of problems.

VALIDATION

In the ECRI-MGD Problem-Solving Model, further assessment is conducted to determine if the child's performance is sufficiently discrepant from expectations to warrant early intervention. The major decision is determining the magnitude or severity of the problem (Shinn, 1995). Validation decisions are based on *repeated* samples of child performance over time to obtain stable estimates of skills. During Problem Validation, multiple IGDIs probes may be administered over a 5- to 10-day period and scores are recorded and graphed. Alternate forms of IGDIs measures are used. This use of repeated measures allows for: (a) a very reliable estimate of level of performance, (b) an estimate of variability of performance, and (c) an initial indication of the current *trajectory* of growth and development.

For example, Problem Identification and Problem Validation data on an IGDI of early literacy for two kindergarten children is depicted in Figure 3. Both Anna and Jeremy performed below the screening cut-off during Problem Identification and a decision was made to assess further in a Problem Validation phase. Anna's performance over the 2-week Problem Validation phase indicates a level of performance that is above the cut-off and some indication that the slope of her progress is positive. Because of her performance, a decision was made not to target Anna for special intervention. In contrast, Jeremy's performance over the 2-week Problem Validation period indicates performance below the cut-off and some indication of lack of adequate progress. For Jeremy, a decision to provide an intervention program would be appropriate.

Figure 3. A comparison of Problem Validation information to cut-off scores for an IDGI on early literacy skills for 2 kindergarten children



EXPLORING SOLUTIONS

The purpose of Exploring Solutions is to determine goals, focus, and intervention strategies that will be utilized for those children identified during the Validation phase of the Problem-Solving model. The types of questions to be answered in the Exploring Solutions Phase are:

1. What kind of intervention program should we provide?
2. What environmental modifications should we make to facilitate development?
3. What are the goals/objectives of instruction?
4. What skills should we teach and how should we teach them?
5. What instructional strategies/arrangements will be used for the intervention?

Exploring Solutions Assessments, including Program Features Assessment, Ecobehavioral Assessment, and Activity-Based Assessment, will be utilized for this step of the Problem-Solving Model. Exploring Solutions Assessments are described in ECRI-MGD Technical Report 5.

It is critical that instructional strategies and arrangements be designed to achieve the desired outcomes and early intervention personnel must repeatedly *evaluate* whether growth and development toward outcomes is occurring. Thus, the phases of Exploring Solutions and Evaluating Solutions go hand-in-hand, with decisions made in each phase guiding the procedures implemented in the other.

EVALUATING SOLUTIONS

A key feature of the Problem Solving model is that the *outcomes of intervention* drive decision making. In the Evaluating Solutions phase, the primary question is whether the selected interventions are effective in increasing the child's progress toward long-term goals. When Evaluating Solutions, repeated measurements over time are used to monitor the progress of targeted children. When children's progress is adequate, interventions are continued. However, when measurement indicates that child progress in acquisition of early literacy skills is not adequate to meet goals, instructional strategies and arrangements are modified. IGDIs will be used on an ongoing basis over time to monitor growth and development over time and to evaluate the effectiveness of interventions being implemented.

RESOLUTION

By using IGDIs and ESAs in the Problem-Solving phases described above, it is possible to identify young children who are at risk for developmental delays and learning difficulties and to evaluate the effectiveness of interventions implemented on a case-by-case basis. The final decision to be made in a Problem Solving model is whether the interventions have been sufficient to solve the problem and whether the child is no longer at risk. During the periodic reviews, the performance of children who are receiving special intervention programs or whose progress is being monitored should be reviewed. Information from IGDIs and ESAs will be used for making Resolution decisions. Essentially, resolution is accomplished when there no longer is a discrepancy between the performance of the target child and expectations.

In the Resolution phase, one of three conditions may be identified. The first condition is that there no longer is a significant discrepancy between the child's performance and current expectations for performance based on normative data. If a child's performance is commensurate with expectations, the problem would be judged to be "solved" and special intervention may be discontinued. The child's progress and skills would still be monitored, although less frequently, to ensure that his or her performance and progress remains consistent with expectations. In the second condition, a discrepancy remains but data indicate that the child's current progress is sufficient for the child to meet expectations. In the second condition, the current intervention strategies would be continued along with the collection of ongoing progress monitoring data. The third condition is that the child's performance is not commensurate with expectations and his/her progress is not sufficient to meet expectations. In the third condition the Problem-Solving model would continue with the Exploring-Solutions phase.

Similarities and Differences Between Problem Solving Model and Current Model of Assessment in Early Intervention

Despite the trend toward a linked system of assessment in early intervention, within the current model of assessment, the linked system begins with programmatic assessment. The assessment steps related to identification, i.e., screening and eligibility determination, are not linked to intervention, nor are they linked to the assessment tools and procedures used for programmatic assessment and evaluation. New assessment models emphasize linkages across assessment activities in which a series of linked assessment activities proceeds in a linear progression from general to more specific. However, while it is proposed in the current model that assessment activities be linked, it is not clear how screening and assessment procedures and tools are linked to one another nor is there a clear framework for how decisions are made.

In contrast, the use of a Problem Solving Model for ECRI-MGD results in a holistic and comprehensive system of assessment and service delivery in which a linked set of assessment procedures tied to long-term outcomes are used for decision making. The resulting model is illustrated in Figure 4.

Figure 4. ECRI-MGD Problem Solving Model

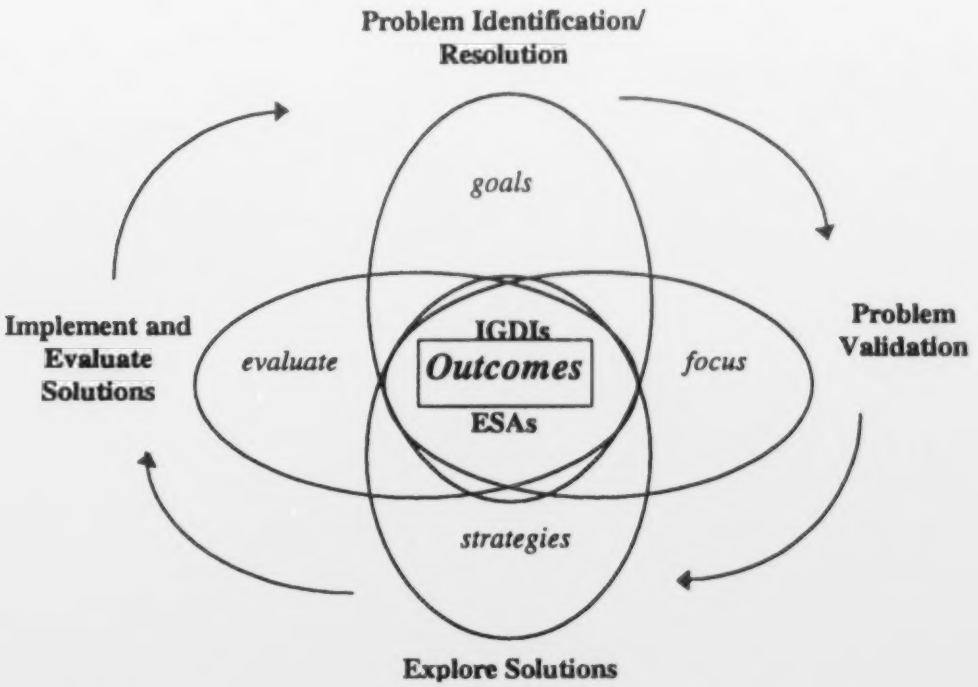
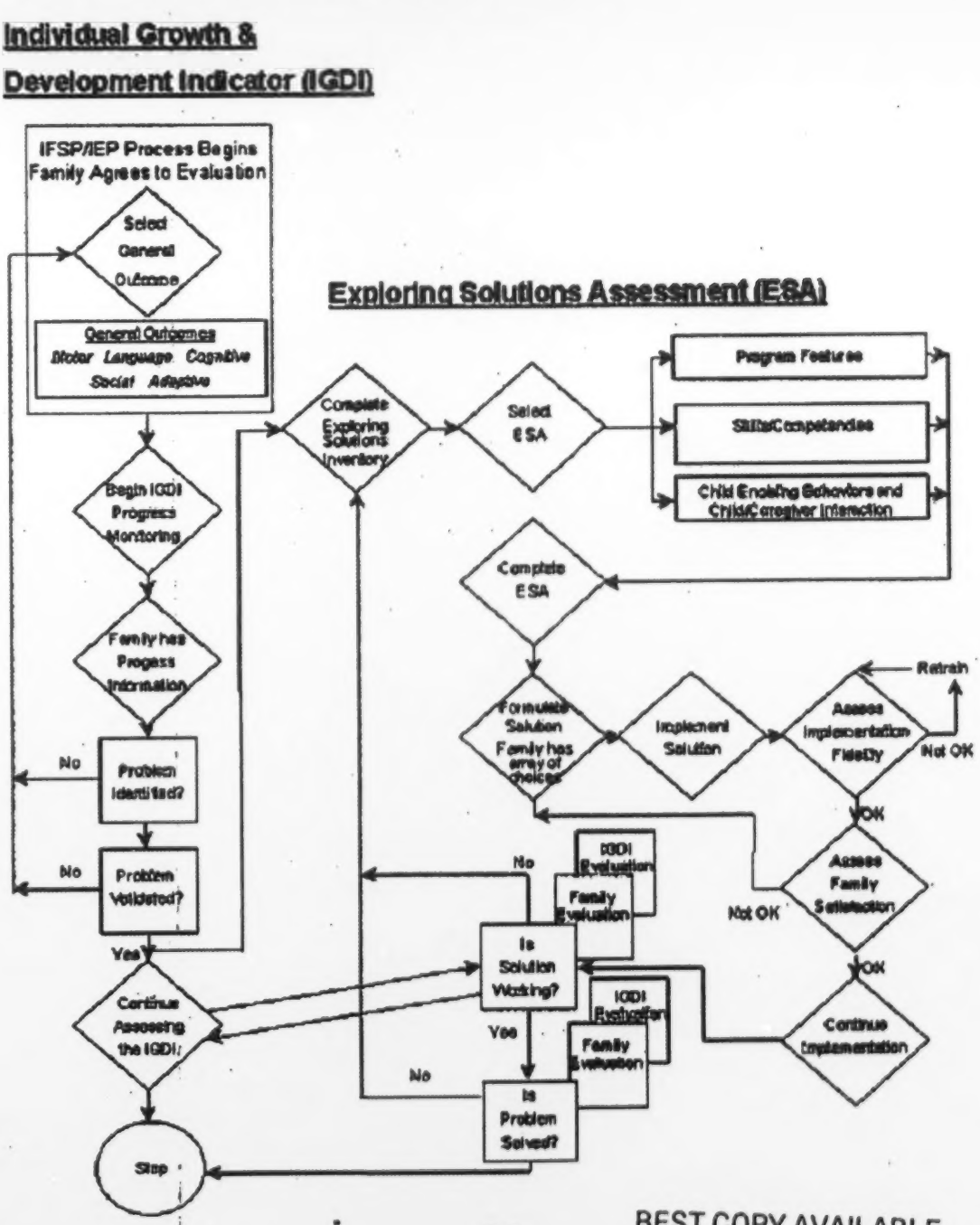


Figure 4 illustrates the overlap or linkage across decision-making phases as well as the linkage of all of the decisions to long-term growth and development Outcomes for young children. The Problem-Solving Model of decision making addresses the limitations of the current model of assessment in early intervention in that the ECRI-MGD Problem-Solving Model provides: (a) clear linkage between instruments and procedures used and information gathered across decision-making phases, (b) clear linkage to long-term outcomes for children and families, and (c) a clear framework for making decisions regarding growth and development and the provision of early intervention services for young children and their families.

The linkage between instruments and procedures used and information gathered across Problem-Solving phases is depicted in Figure 5. As illustrated in the flow chart in Figure 5, IGDIs are used to make Problem Identification and Problem Validation decisions. Once a problem is validated, ESAs support the Exploring Solutions decision by providing information about the program, child-caregiver/child-teacher interactions within natural contexts (e.g., home, classroom), and the child's skills and competencies within a developmental hierarchy or curriculum. IGDIs then are used to evaluate the effectiveness of interventions. If an intervention is not effective in changing a child's trajectory, the intervention team continues to Explore Solutions and Evaluate Solutions. This cycle of Exploring/Evaluating Solutions remains ongoing until there is no longer a significant discrepancy between the child's performance and expectations.

A linked use of IGDIs and ESAs within the Problem Solving Model depicted in Figure 5 allows us to use an approach to assessing young's children's development that differs from the current model in a number of ways. First, in the ECRI-MGD Problem-Solving Model, the focus is on the *continuous* growth and development of children across the developmental spectrum from birth to 8 years of age rather than of children within different age groups (i.e., infant, toddler, preschool, elementary school). In this model, growth and development across the entire early childhood age range is both continuous and linked to important long-term Outcomes for children. Because of the focus on continuous growth, development is assessed on an ongoing basis, rather than once or twice a year in pre- and post-tests. Thus, it is possible to track an individual child's progress idiographically, as well as normatively. For example, it is possible to compare the child's growth and development toward important long-term Outcomes with that of same-age peers to determine if the child's growth and development is satisfactory or if there is cause for concern. In addition, it is possible to compare the child's growth and development toward long-term Outcomes *prior to* receiving intervention with the child's development and growth *during* intervention. In this way, it is possible to evaluate the effectiveness of various interventions to determine *which intervention is most effective* in facilitating the child's growth and development. Finally, in the ECRI-MGD Problem-Solving Model, the development of interventions is based on assessment of *environmental and programmatic variables* in addition to *child* variables. This broad-based focus differs from the more traditional assessment practice of assessing child development without specific links to programmatic or individualized intervention.

Figure 5. ECRI-MGD Problem Solving Flow Chart



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Summary

In this technical report we have presented a Problem-Solving model to be used as a theoretical foundation for ECRI-MGD. The importance of a decision-making framework to guide important decisions within the assessment/service delivery system in early intervention cannot be overstated. In the ECRI-MGD Problem-Solving Model, there is linkage between each phase of decision-making and all phases of decision making are clearly linked to long-term outcomes for children and families. IGDIs are used across decision-making phases and are clearly linked to ESAs, the tools and procedures used for developing interventions. In addition, each decision as well as the instruments and procedures used to provide information for decision-making are linked to long-term outcomes for children and families. In this way, it is possible to assess growth and development over time to determine developmental trajectories. Children whose developmental trajectory is sufficiently discrepant from expectations are identified in a timely manner, and interventions are designed to promote development. Through continued ongoing assessment of growth and development, effectiveness of interventions can be measured and modifications made in interventions when needed, ultimately leading to improved outcomes for children and families.

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